

"You too can be selected, naturally"
The evolution of the spotted bug-bird

Introduction:

Today you are all "spotted bug-birds", members of the species *Birdicus spottedbugicus*, which is the best bird in the world at finding and eating their favorite meals, spotted bugs. These bugs are unique because they have no legs, no eyes, and no noticeably functional features. In fact they have an uncanny resemblance to beans. But make no mistake about it, these tasty bugs are your favorite things to eat and are actively sought out by all members of your species. Take a good look around you...those famished, beady eyed birds are your competition. Yes that's right!!! It's you or them!!! Seek and destroy, spotted bug-bird!!!

You are a migrating bird, and today you are passing over Flanders' fertile farm on your way north for the winter. That's right NORTH!!! You're a weird bird. In the pasture you spot the brown spotted bugs basking in the sun's rays. Lucky for you, since these insanely stupid bugs have no ears, eyes or legs to run away or warn them from danger, they do not see you coming. Its ripe picking!!! Although there is only one species of this bug, it is found in a variety of different color forms: brown, green, yellow, blue and red. (*Spottedbugicae brownicus*, *Spottedbugicae chloris*, *Spottedbugicae giallo*, *Spottedbugicae blan*, and *Spottedbugicae roseus*.) *Spottedbugicae brownicus* (brown) is most commonly found in New England.

Farmer Flanders favors these incredibly stupid insects because they fertilize his farm, thus allowing for his flora and fauna to flourish come springtime. So beware *Birdicus spottedbugicus*, Farmer Flanders is lurking. Gather and horde as many of these dumb bugs as you can, but be ready to make a hasty retreat in case Farmer Flanders sees you. It could be your last meal, as well as your hungry family's!!

When you fly out to the grassy pasture, wait along its side until the signal is given. Then start picking up the dumb brown spotted bugs as fast as you can. You don't have much time because Farmer Flanders will be around soon enough to chase you nasty birds out of his perfect pasture. When he does, fly away to the safety of your nest as fast as you can and count your bugs. When the coast is clear, wait for the signal again and fly back in for another feast.

Name Catherine Cook Block W-2 Date 2/24/09

-16 24/40 + 5 29/45

Name _____

Block _____

Date _____

Bird Lab

Introduction:

Species

natural selection

variety

evolution

Purpose:

to understand

natural selection

and how fitness applies

and how a species can survive

Hypothesis:

The bugs will all be eaten and the

birds will either die or have to

move away.

Materials:

beans (bugs)

paper

cups for holding beans (bugs)

wide space.

Procedure:

1. Obtain your materials and assemble near the farm.
2. When given the signal, begin collecting your "prey" (beans)
3. You will hunt for 2 minutes.
4. You may not pick up more than one bean at a time.
5. There is no talking and fighting birds will be declared dead and will be removed from the round.
6. After 2 minutes you will count the number of prey (beans) collected and record the number.
7. Give the total to the instructor, and then return the prey (beans) back to the farm.
8. All students will then pick up their "prey" for 2 minutes.
9. After 2 minutes you will count the number of beans collected and record the number. Give the total to the instructor, and then return the prey (beans) back to the farm.
10. Round 3 is the same as round 2, except a predator will be introduced to the environment (Farmer Flanders).
11. The number of beans will be recorded and given to the instructor.
12. For the final round, all students will be given the mutation.
13. After 2 minutes, The number of beans will be recorded and given to the instructor.

Observations:

- Describe your "bird" population:
2 fast a few dumb ones
1 short smart
1 handicapped slow
Describe your "prey" (beans):
small, light brownish

- Describe the environment:
grassy, big,

- Describe the predator:
blind, blind, slow

all mutations
a few more mutations
few mutations

Round 1	Round 2	Round 3	Round 4
Individual #	47	40	64
1 st population (average)	37.2	47.0	X
2 nd population (average)	X	55.7	60.2

Round 1	Round 2	Round 3	Round 4
Highest # of beans (student name and population #)	Sum 5 - 62	Sum 5 - 97	Kyle - 90
Lowest # of beans (student name and population #)	Elang - 26	Mat B - 18	Mat B - 13
			Christine - 25

Energy: Number of bugs (beans) required for survival 35 Actual number of beans

Number of bugs (beans) required for offspring 10 Actual number of beans

Conclusion:

Which population was better adapted for picking up beans? Why? And what is an adaptation?

the ones with the mutation

untaped fingers

What is fitness? In which round did you have the most fitness? And how do you know?

is a measure of an individual's ability to survive and reproduce and how fit some members

round 4

Describe the differences between round 2 and 3. What effect did the predator have on your ability to hunt for beans?

more and more birds got a mutation

the predator

Making predictions:

1. What would happen if there were different colored beans instead of just normal beans? (green, yellow, red, blue in equal amounts) In other words, how would these color differences affect your ability to pick them up?

2. Which bean color do you think would be better adapted for a grassy field? A beach?

Observations:

- Describe your "bird" population:
2 fast a few dumb ones
1 short smart
1 handicapped slow
- Describe your "prey" (beans):
small, light brownish

- Describe the environment:
grassy, big,

- Describe the predator:
blind, aided
slow

all mutations
a few more mutations
few mutations

	Round 1	Round 2	Round 3	Round 4
Individual #	47	40	57	64
1 st population (average)	37.2	47.0	38.6	X
2 nd population (average)	X	55.7	58.1	60.2

	Round 1	Round 2	Round 3	Round 4
Highest # of beans (student name and population #)	Sum 5 - 62	Sum 5 - 97	Kyle - 76	Kyle - 90
Lowest # of beans (student name and population #)	Elang - 26	Mat B - 18	Mat B - 13	Christine - 25

3. What would happen if the predator did not wear a blindfold? Is that a good or bad adaptation for the predator? Good or bad adaptation for our population?

4. What would be another adaptation that would help:
a) our population become better hunters?

b) the predator become better at hunting?

c) the prey better at preventing being eaten? (other than color changes)

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Name _____ Block _____ Date _____

Introduction:

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Farmer Flanders favors these incredibly stupid insects because they fertilize his farm, thus allowing for his flora and fauna to flourish come springtime. So beware *Birdicus spottedbugicus*, Farmer Flanders is lurking. Gather and horde as many of these dumb bugs as you can, but be ready to make a hasty retreat in case Farmer Flanders sees you. It could be your last meal, as well as your hungry family's!!

When you fly out to the grassy pasture, wait along its side until the signal is given. Then start picking up the dumb brown spotted bugs as fast as you can. You don't have much time because Farmer Flanders will be around soon enough to chase you nasty birds out of his perfect pasture. When he does, fly away to the safety of your nest as fast as you can and count your bugs. When the coast is clear, wait for the signal again and fly back in for another feast.

Introduction:

natural selection - process where many related species evolve from a single ancestral species

species - a group of organisms that share characteristics

evolution - gradual change in a species through adaptations over time

competition - two organisms competing for something

to see if a mutation in a species will allow them to become better hunters.

Hypothesis:

being able to use all fingers would allow the birds to be more efficient hunters.

Materials:

6 cups
type

Procedure:

1. Obtain you materials and assemble near the farm.
2. When given the signal, begin collecting your "prey" (beans)
3. You will hunt for 2 minutes.
4. You may not pick up more than one bean at a time.
5. There is no talking and fighting birds will be declared dead and will be removed from the round.
6. After 2 minutes you will count the number of prey (beans) collected and record the number.
7. Give the total to the instructor, and then return the prey (beans) back to the farm.
8. For round 2 some students will be given a mutation.
9. All students will then pick up their "prey" for 2 minutes.
10. After 2 minutes you will count the number of beans collected and record the number. Give the total to the instructor, and then return the prey (beans) back to the farm.
11. Round 3 is the same as round 2, except a predator will be introduced to the environment (Farmer Flanders).
12. The number of beans will be recorded and given to the instructor.
13. For the final round, all students will be given the mutation.
14. After 2 minutes, The number of beans will be recorded and given to the instructor.

Observations:

- Describe your "bird" population:
 • slow - quick • small - large
 • short

- Describe your "prey" (beans):
 speckled, brown small

- Describe the environment:
 short grass, field

- Describe the predator:
 slow, dumb, blind

Data:

	Round 1	Round 2	Round 3	Round 4
Individual #	47	75	76	90
1 st population (average)	37.2	47.0	38.6	X
2 nd population (average)	X	55.7	58.1	60.2

	Highest # of beans (student name and population #)	Lowest # of beans (student name and population #)
Round 1	62 - sam	26 - Elana
Round 2	97 - sam	18 - Matt B
Round 3	76 - Kyle (M)	13 - Matt B
Round 4	90 - Kyle (M)	25 - Christine

Energy:

Number of bugs (beans) required for survival

35

Actual number of beans

Number of bugs (beans) required for offspring

10

Actual number of beans

Conclusion:

Which population was better adapted for picking up beans? Why? And what is an adaptation?

The population with the mutation, they have five fingers, so they are able to pick up beans easier.

What is fitness? In which round did you have the most fitness? And how do you know?

the ability to survive and reproduce. round 4, I collected more beans than any other round. Kids!

Describe the differences between round 2 and 3. What effect did the predator have on your ability to hunt for beans?

It distracted people from collecting beans. Making them slow down. Beans 7 or 1.

Making predictions:

1. What would happen if there were different colored beans instead of just normal beans? (green, yellow, red, blue in equal amounts) In other words, how would these color differences affect your ability to pick them up?

different color beans would blend with its surroundings. Which ones?

2. Which bean color do you think would be better adapted for a grassy field? A beach?

green bean

3. What would happen if the predator did not wear a blindfold? Is that a good or bad adaptation for the predator? Good or bad adaptation for our population?

good for the predator, bad for population
he could see and hunt the birds
easier.

4. What would be another adaptation that would help:
a) our population become better hunters?

~~more fingers or hands,~~ mutation
being able to move → adaptation
faster.

b) the predator become better at hunting?
being faster, better vision

c) the prey better at preventing being eaten? (other than color changes)

~~being able to move, and see~~
move slightly - mutation

Name Diana Benach Block 500 Date 2/24/09

33/45 37.5/40 + 4 ~~41.5/45~~ 20%

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Name _____

Block _____

Date _____

Bird Lab

group of organisms that can interbreed

and produce fertile offspring in nature

Introduction:

Species -

such organisms with better variations survive

change in a species through adaptations over time.

Evolution - gradual change in a species through adaptations over time.

Migration - instinctive seasonal movement of animals from place to place

Purpose:

How getting more food or not based on mutations changes the outcome of survival of each individual.

Hypothesis:

I think the birds with 3 fingers will

decrease because the predator will come and they

So as the ones with 5 fingers will survive better.

Materials:

beans, cup, nap, cones

Procedure:

1. Obtain you materials and assemble near the farm.
2. When given the signal, begin collecting your "prey" (beans)
3. You will hunt for 2 minutes.
4. You may not pick up more than one bean at a time.
5. There is no talking and fighting birds will be declared dead and will be removed from the round.
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14. After 2 minutes, The number of beans will be recorded and given to the instructor.

Observations:

- Describe your "bird" population:

9 - girls

10 - boys

- Describe your "prey" (beans):

~~blind~~ blind, no legs, spotted brown, tan.

- Describe the environment:

dirt, slightly grassy, open (and)

- Describe the predator:

~~run, tall, blind folded~~

Data:

	Round 1	Round 2	Round 3	Round 4
Individual #	36	41	dead	20
1 st population (average)	42.3	51.6	47.6	X
2 nd population (average)	X	71.4	59.2	55.4

	Round 1	Round 2	Round 3	Round 4
Highest # of beans (student name and population #)	75 - Corey	45 - Sharon	103 - Zack	98 - Corey
Lowest # of beans (student name and population #)	22 - Connor	22 - Christina	Beth/Christina - 15	4 - Tom

Energy: _____
 Number of bugs (beans) required for survival 35
 Actual number of beans _____
 Number of bugs (beans) required for offspring 10
 Actual number of beans _____

Conclusion:

Which population was better adapted for picking up beans? Why? And what is an adaptation?

and the population. Because in the end of the population with the mutation. They had five fingers and they adapted to getting beans off we got use to the predator and pink we beans. A adaptation is when I've another animal what is fitness? In which round did you have the most fitness? And how do you know? does the fitness - being stronger than the other some kind of species but having different variations to survive and be stronger ~~the~~ I had the most beans ~~Kids~~ that round 2 than the other ones. Describe the differences between round 2 and 3. What effect did the predator have on your ability to hunt for beans? Round 2 I had no most beans and in round 3 I died. The predator had a big effect on my ability in round 3 because I died. ~~the~~ the predator only had a effect on my ability to get beans in round 3. Making predictions:

1. What would happen if there were different colored beans instead of just normal beans? (green, yellow, red, blue in equal amounts) In other words, how would these color differences affect your ability to pick them up? If the beans were lighter colors we'd be able to see them better and get them faster. So that would effect the number of birds dying.

2. Which bean color do you think would be better adapted for a grassy field? A beach?

for a grassy field - red

A beach - blue if your staying around on the sand
 Green - if you mean the whole beach

3. What would happen if the predator did not wear a blindfold? Is that a good or bad adaptation for the predator? Good or bad adaptation for our population?

More birds would die and more birds who survived wouldn't get as much food. That's a good adaptation for the predator. That's a bad one for our population.

4. What would be another adaptation that would help:

a) our population become better hunters?
if we were faster, had better vision, more mobile

that's an adaptation

-1/2

b) the predator become better at hunting?

~~if we were faster and better hearing, faster.~~

better vision

c) the prey better at preventing being eaten? (other than color changes)

Having better hearing skills, being faster and stronger, having better vision, run faster.